REVISION: 201204
DOC: 841602
ENGLISH

ASSEMBLY INSTRUCTIONS MICROPROP DC2

TRACK CONTROL

In control
Control Systems for Mobile Machinery

CONTENT

1.	**Safety regulations**	**7**
1.1.	General	7
1.2.	Checklist Safety	7
2.	**Symbols**	**9**
3.	**Checklist of content**	**10**
3.1.	841304/841305 Track control	10
3.2.	841309/841310 Track control single feeder	11
3.3.	841311/841312 Track control double feeder	12
4.	**Assembly**	**13**
4.1.	Area F (cabin)	14
4.1.1.	Overview	14
4.2.	Area G (cabin)	15
4.2.1.	Connecting supply voltage	15
4.2.2.	Connecting X1 separate track control	16
4.2.3.	Connecting X1 track control with double feeder	17
4.2.4.	Connecting X1 track control with single feeder	18
4.2.5.	Connecting X1 to cabin module	19
4.2.6.	Connecting activation switch 841119	19
4.2.7.	Connecting activation switch 841119 (X3)	20
4.2.8.	Label activation track control	21
4.3.	Area H (Beneath cabin floor)	22
4.3.1.	Connecting track control hydraulics	22
4.3.2.	Connecting track control hydraulics with single feeder	23
4.3.3.	Connecting track control hydraulics with double feeder	24
5.	**Comissioning**	**25**
5.1.	Calibration	25
5.2.	Functional check	26
6.	**Alarms**	**27**
6.1.	Alarm explanation	27

6.2. Alarm overview 28
6.3. List of alarms 29
7. Technical data 32
7.1. Cabin module (CM) 32
7.1.1. Connectors 33
7.2. System overview 35

GENERAL

The purpose of this assembly instruction is to give relevant information in order to assembly Microprop DC2. Stated safety information is independent of machine model and directly connected to Microprop DC2. Aside from this assembly instruction you must read and understand the safety information of the machine and other equipment.

Note that if a machine specific instruction exists for your machine it is superior to this instruction.

WARNING!

Do no attempt to assemble, use or maintain the Microprop DC2 before you have read and understood all information regarding the tiltrotator, optional equipment and the machine. Be very attentive to the safety information.

DECLARATION OF INCORPORATION

This declaration covers the control system Microprop DC2 track control

Microprop AB hereby declares that the control system complies with directive: 2006/42/EC, Annex 1; clause 1 and 3 and that the technical documentation is compiled in accordance with Annex 7 (B) of the directive.

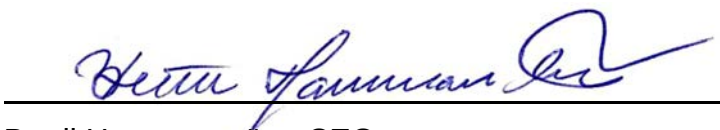
Microprop AB undertakes to transmit, in response to a reasoned request by the appropriate national authorities, relevant information on the machine identified above.

The control system is incomplete and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2006/42/EG.

We declare that the control system as above complies with directive: 2004/108/EG and 2006/42/EG.

Harmonising standards	Note
SS-EN ISO 13849-1:2008	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
SS-EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
SS-EN 474-1:2006+A1:2009	Earth-moving machinery - Safety - Part 1: General requirements
SS-EN 474-5:2006+A1:2009	Earth-moving machinery - Safety - Part 5: Requirements for hydraulic excavators
SS-EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
SS-ISO 15998:2008	Earth-moving machinery - Machine-control systems (MCS) using electronic components - Performance criteria and tests for functional safety
SS-EN 13309:2010	Construction machinery - Electromagnetic compatibility of machines with internal power supply

Responsible for compiling the technical documentation
Roberth Jonsson, product manager Microprop DC2

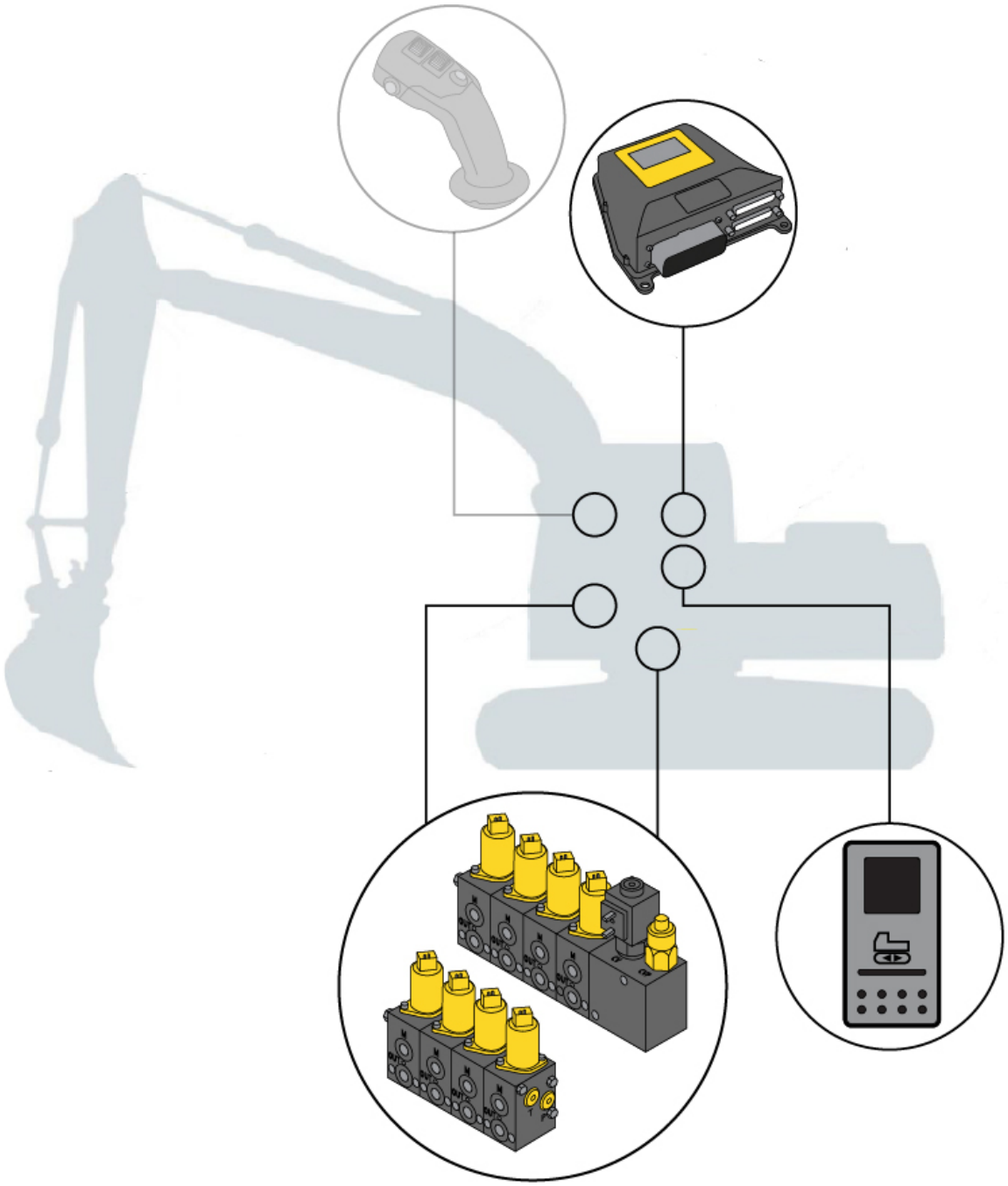


Bertil Hammarström, CEO

2011-12-31 Umeå

Microprop AB
Industrivägen 8
901 30 Umeå

SYSTEM OVERVIEW – MICROPROP DC2



1.SAFETY REGULATIONS

1.1. GENERAL

It is of outmost importance that you have read and understood all warnings before assembling and using the tiltrotator/rotator and supplied equipment. The warnings focus on potential risks and how these are avoided. If uncertain – contact your employer or supplier.

Remember – with a good judgment and great knowledge of the machine many risks are sufficiently reduced. The user should therefore make time to learn how to use Microprop DC2 and the other equipment in a safe way before the machine is put into service.

1.2. CHECKLIST SAFETY

WARNING!

Broken or damaged equipment can cause injury or damage on persons, environment or property. Ensure that service and maintenance is made according to recommendation.

WARNING!

Never attempt to increase the equipment's maximum capacity by modifications not approved by the supplier.

WARNING!

Exchange damaged and/or unreadable labels and warning signs before the machine is put into use.

WARNING!

Maintenance and reparation of the electrical system may only be made by educated personnel.

WARNING!

Risk of crushing at moving parts.

WARNING!

If uncertain of knowledge, equipment or working on safety details – contact your sypplier or engcon Sweden AB.

WARNING!

Make sure that the labels are consistent to the machine function before putting the machine in use.

WARNING!

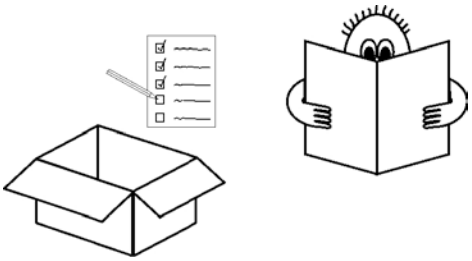
Assembling and calibration may only be made by an authorized work shop. Changes in the assembly may not be made without the manufacturer’s consent.

WARNING!

Be careful when calibrating the track control as the machine might move in unexpected ways. Make sure there is enough space to maneuver the tiltrotator safely.

Risk for person injury

2.SYMBOLS

	Track control
WARNING!	Read attached documtation for more information.
	No / incorrect measure
	Yes / correct measure
	Read attached documtation for more information.
CM	Cabin module

3.CHECKLIST OF CONTENT

3.1. 841304/841305 TRACK CONTROL

Pos	Artikel	Benämning	Antal
1	841105	Cabin module Microprop DC2	1
2	841147	Cable X1 35-pol	1
3	841118	Cable track control	1
4	841128	Oil feeder valve track control incl. safety block	1
5	841135	cable IO d-sub X3 full	1
6	841119	Activation switch track control	1
7	841143 841144	Coil 12V Coil 24V	1
8	841163	Label track control	1

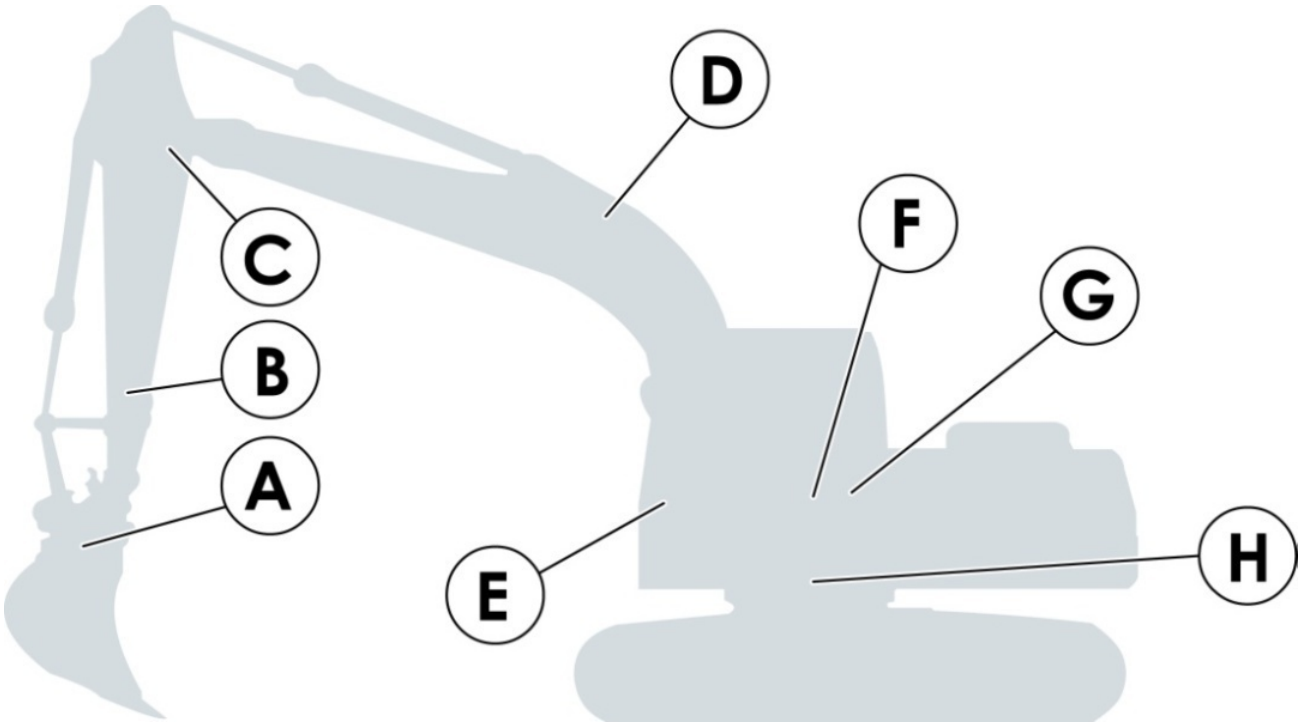
3.2. 841309/841310 TRACK CONTROL SINGLE FEEDER

Pos	Artikel	Benämning	Antal
1	841301	Electronics single feeder	1
2	841118	Cable track control	1
3	841128	Oil feeder valve track control incl. safety block	1
4	841135	Cable IO d-sub X3 full	1
5	841119	Activation switch track control	1
6	841143 841144	Coil 12V Coil 24V	1
7	841163	Label track control	1

3.3. 841311/841312 TRACK CONTROL DOUBLE FEEDER

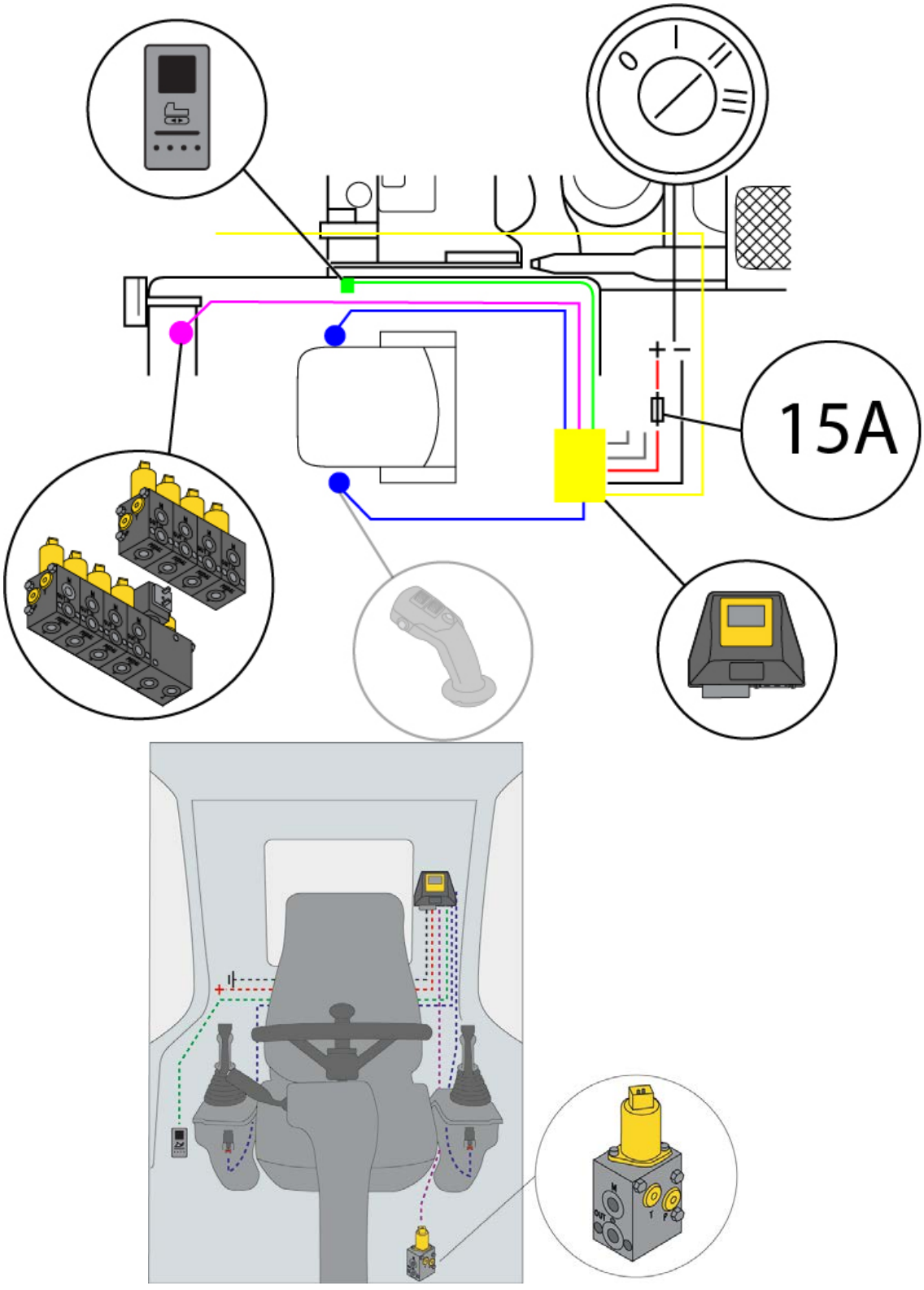
Pos	Artikel	Benämning	Antal
1	841302/841303	Electronics double feeder	1
2	841118	Cable track control	1
3	841127	Oil feeder valve track control ex. safety block	1
4	841119	Activation switch track control	1
5	841163	Label track control	

4.ASSEMBLY



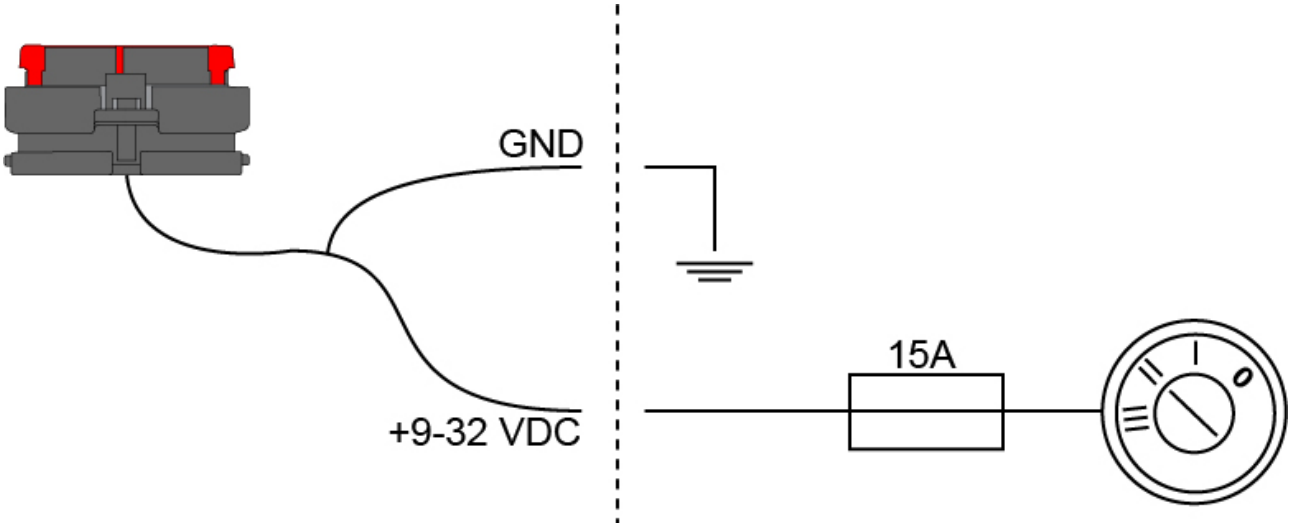
4.1. AREA F (CABIN)

4.1.1. Overview

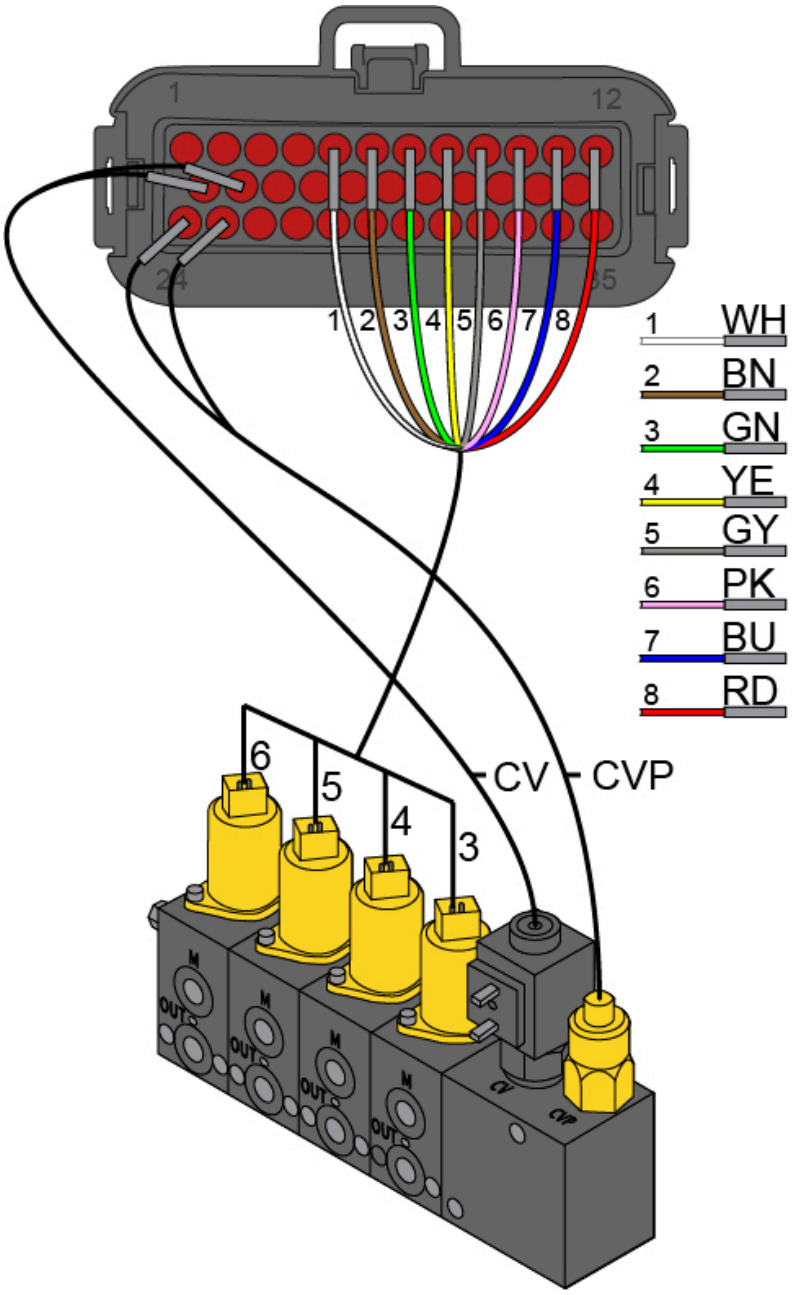


4.2. AREA G (CABIN)

4.2.1. Connecting supply voltage

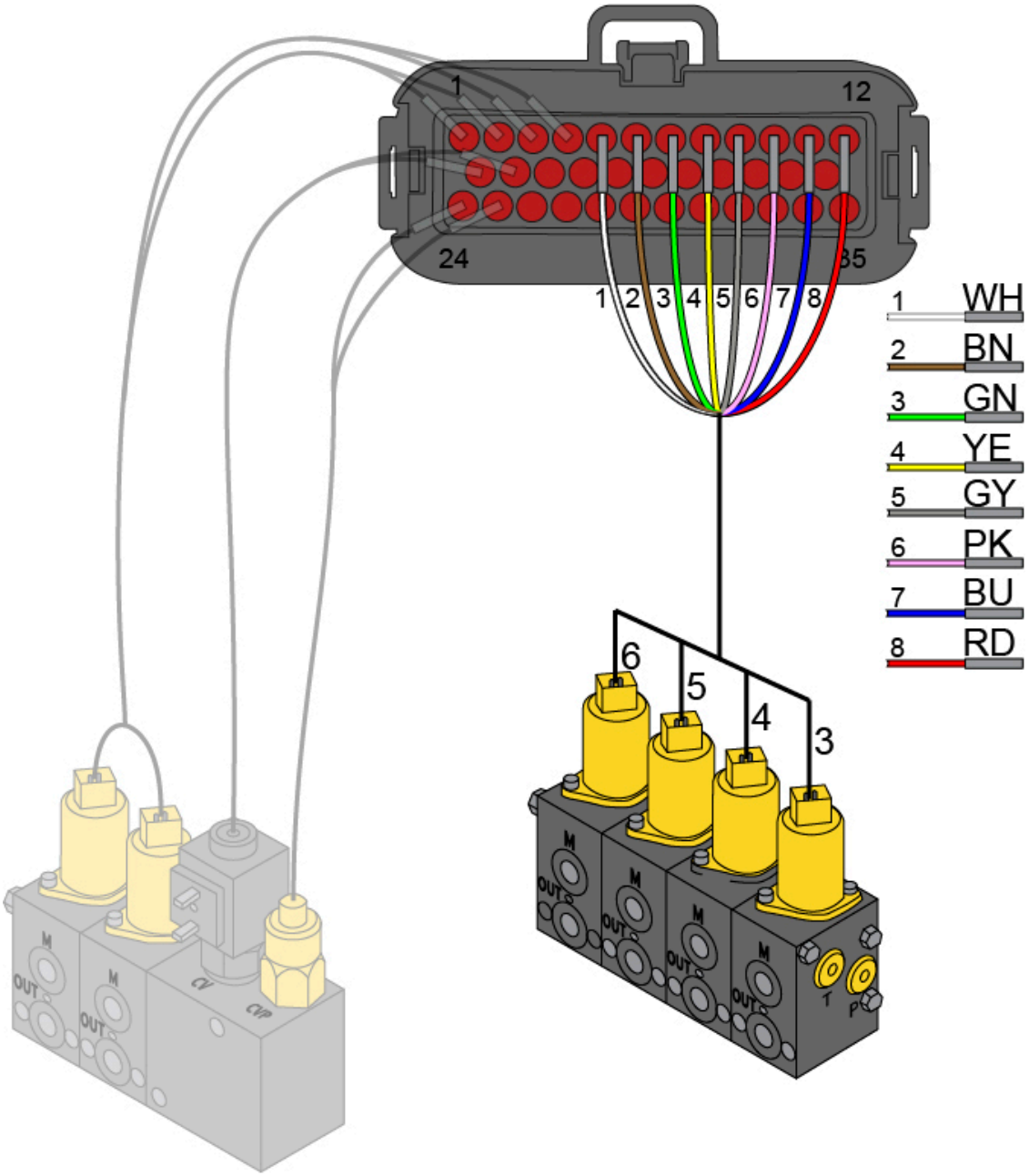


4.2.2. Connecting X1 separate track control



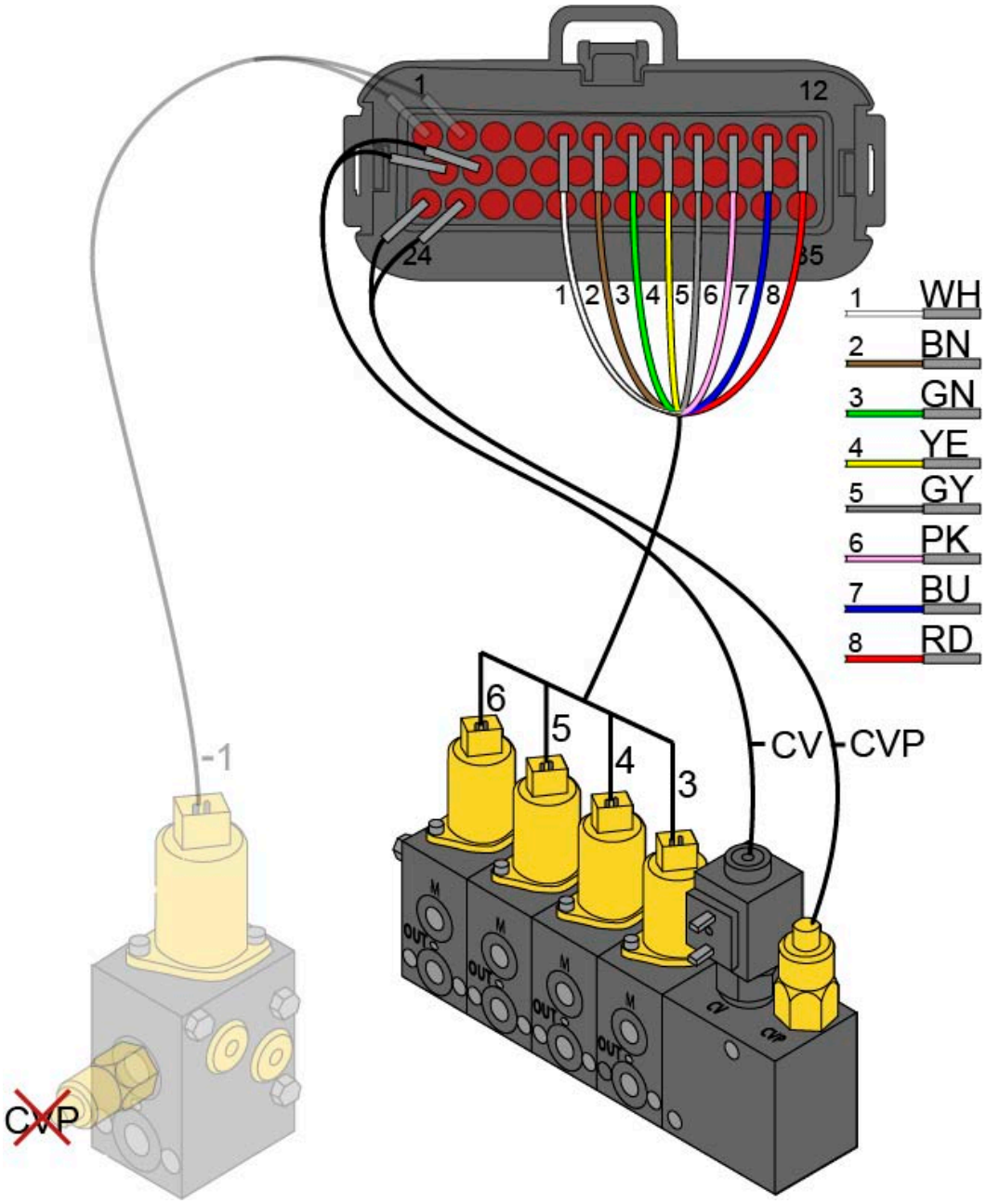
Pos	
3	Left backwards
4	Left forward
5	Right backwards
6	Right forward

4.2.3. Connecting X1 track control with double feeder



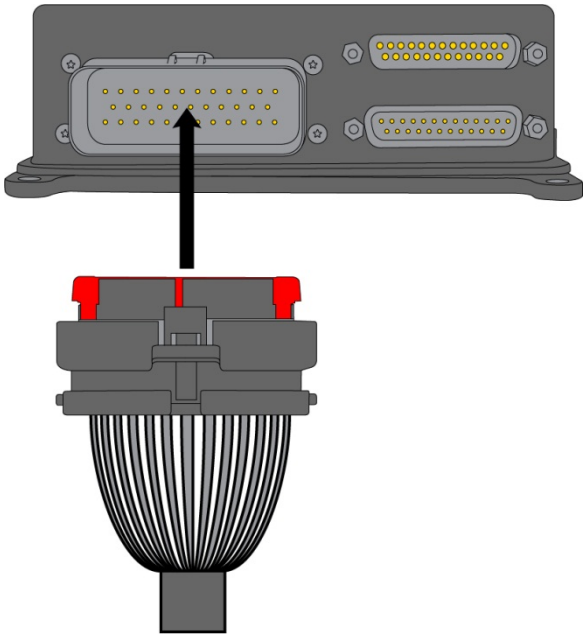
Pos	
3	Left backwards
4	Left forward
5	Right backwards
6	Right forward

4.2.4. Connecting X1 track control with single feeder

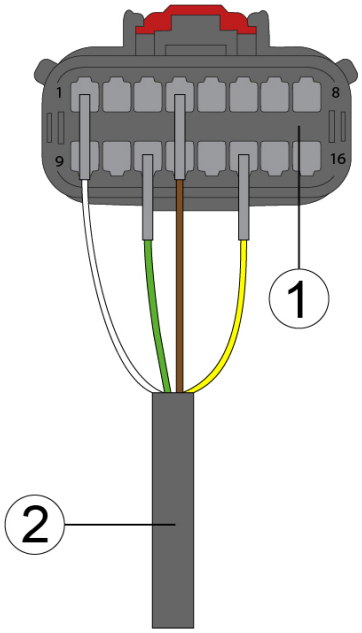


Pos	
3	Left backwards
4	Left forward
5	Right backwards
6	Right forward

4.2.5. Connecting X1 to cabin module

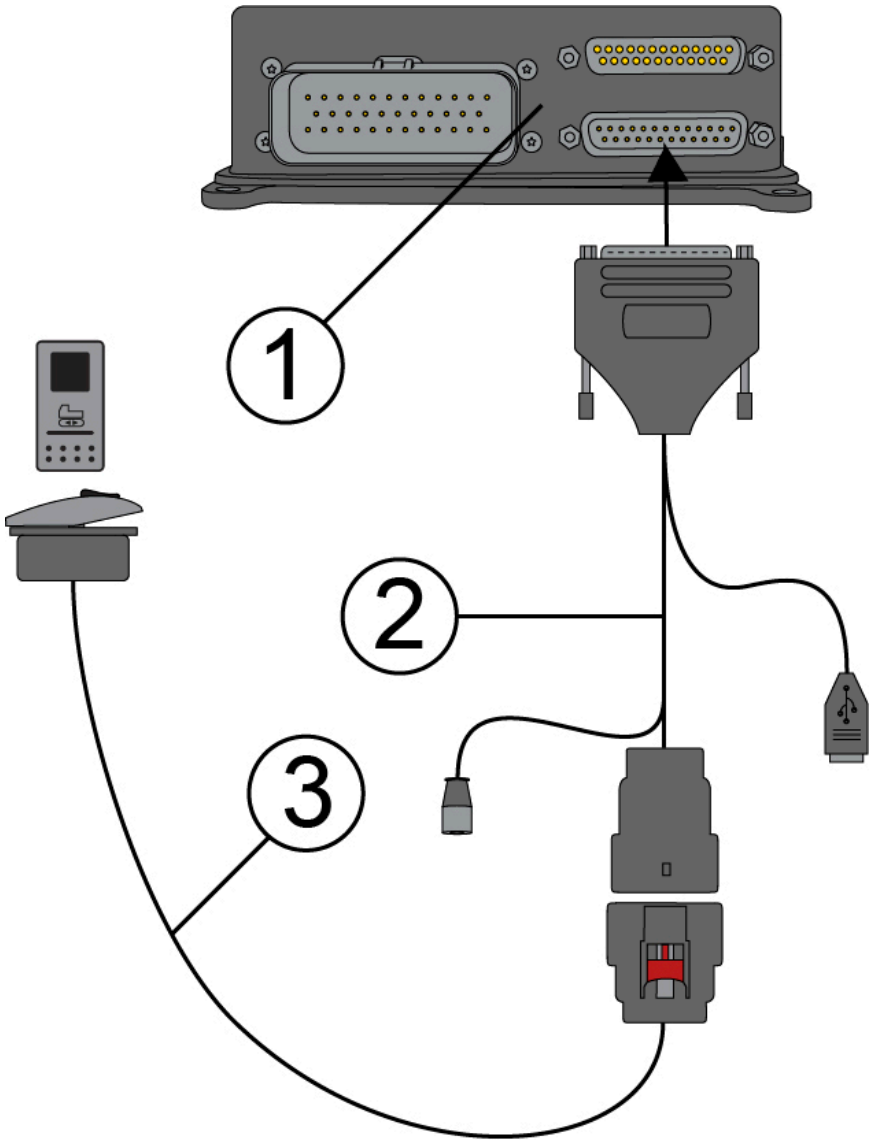


4.2.6. Connecting activation switch 841119



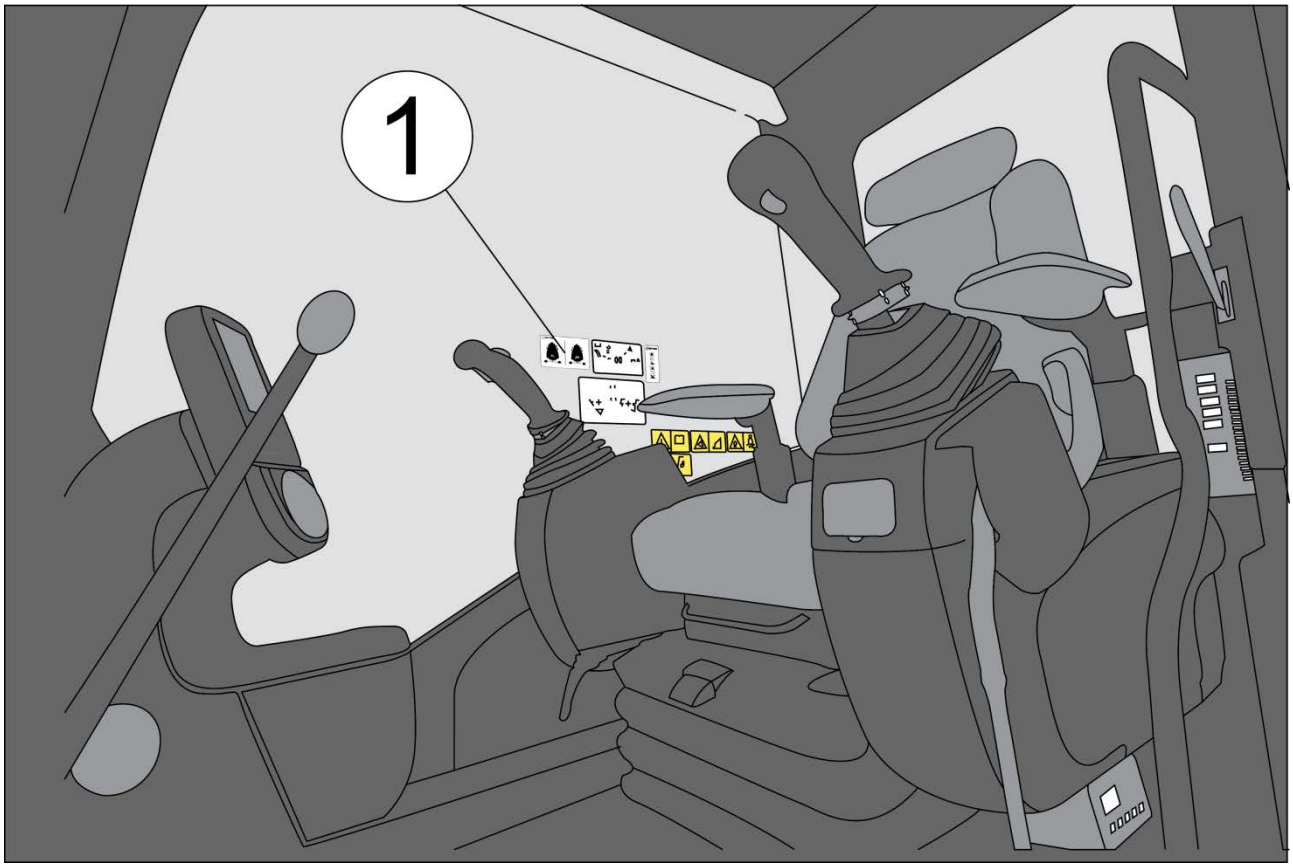
Pos	Artikel
1	841135
2	841119

4.2.7. Connecting activation switch 841119 (X3)



Pos	Artikel
1	841105
2	841135
3	841119

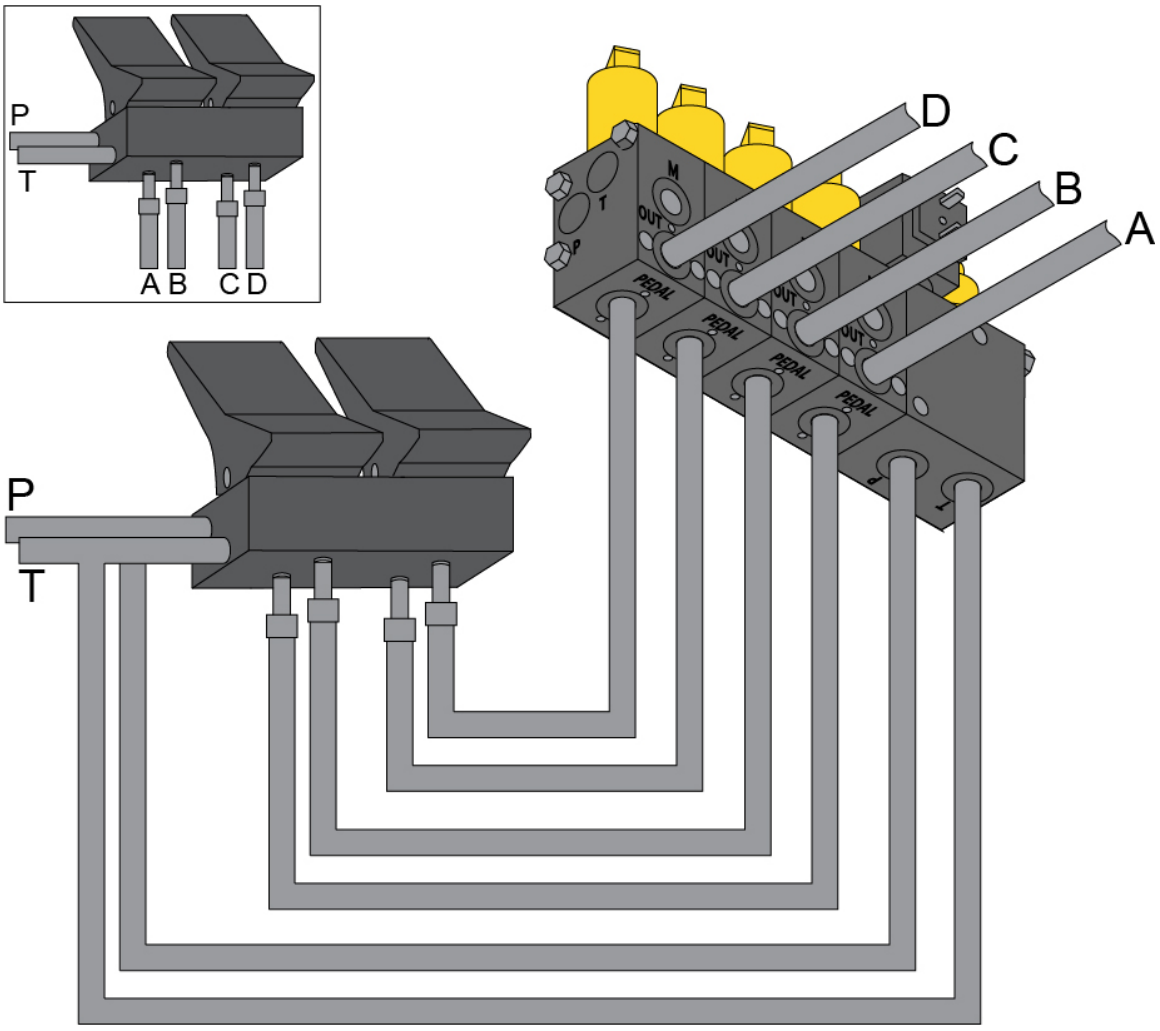
4.2.8. Label activation track control



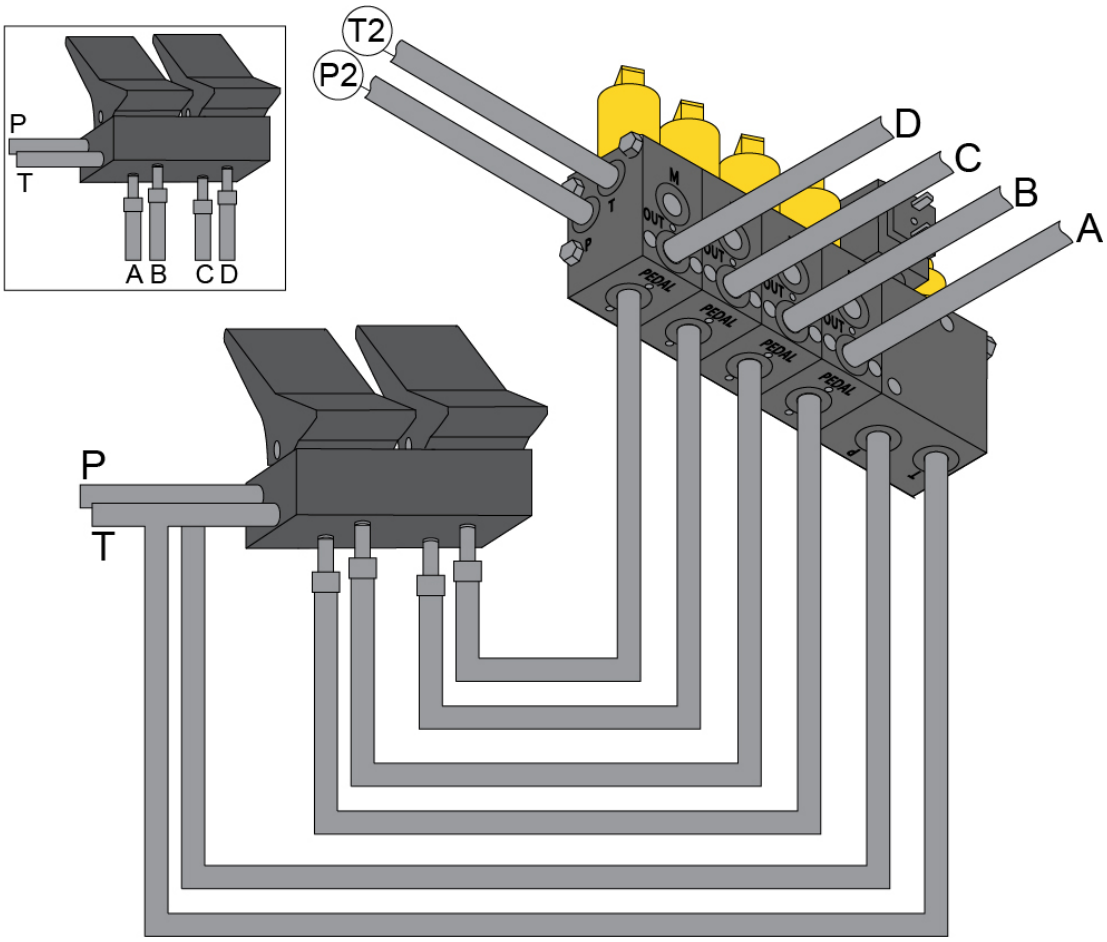
Pos	Artikel
1	841163

4.3. AREA H (BENEATH CABIN FLOOR)

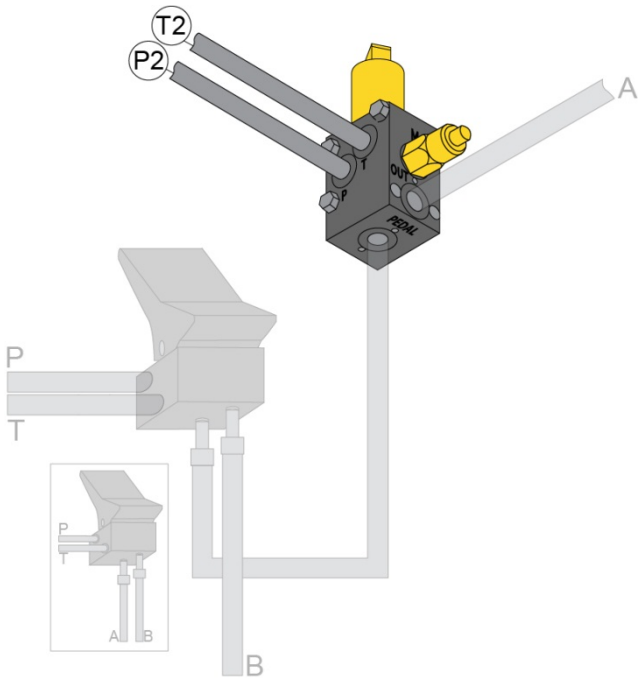
4.3.1. Connecting track control hydraulics



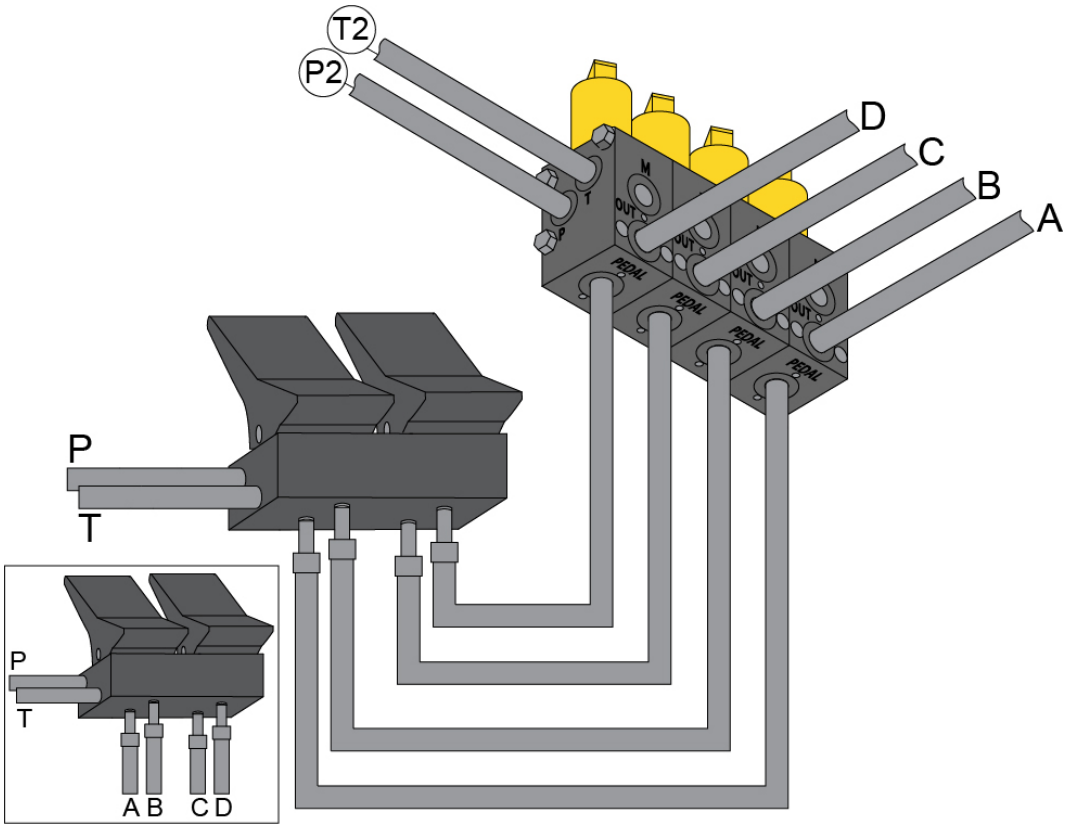
4.3.2. Connecting track control hydraulics with single feeder



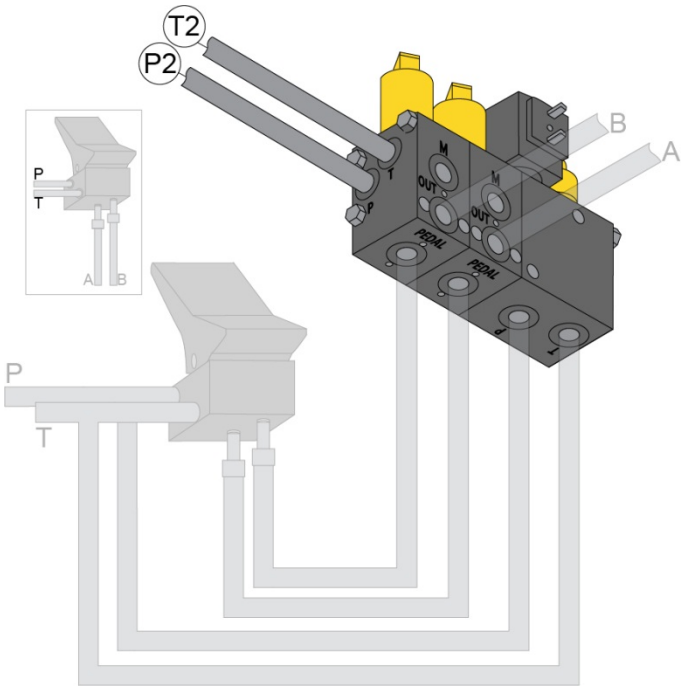
Note that pressure to the single feeder must be taken from the track control hydraulics..



4.3.3. Connecting track control hydraulics with double feeder



Note that pressure to the track control must be taken from the double feeder hydraulics.



5.COMISSIONING

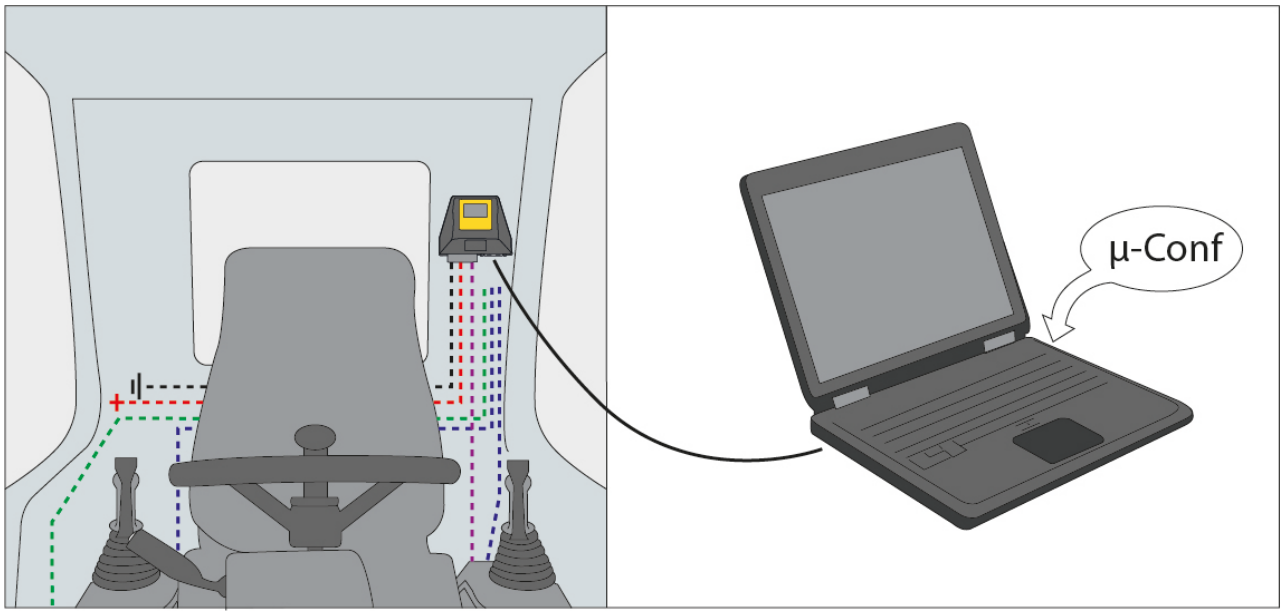
5.1. CALIBRATION

WARNING!

Be careful when calibrating the track control as the machine might move in unexpected ways. Make sure there is enough space to maneuver the tiltrotator safely.

Risk for person injury

Microprop DC2 is calibrated with PC and the PC-program Microconf DC2 which can be downloaded from www.engcon.se.



5.2. FUNCTIONAL CHECK

Make sure that all functions correspond to labels and user manual for the machine and Microprop DC2.

WARNING!

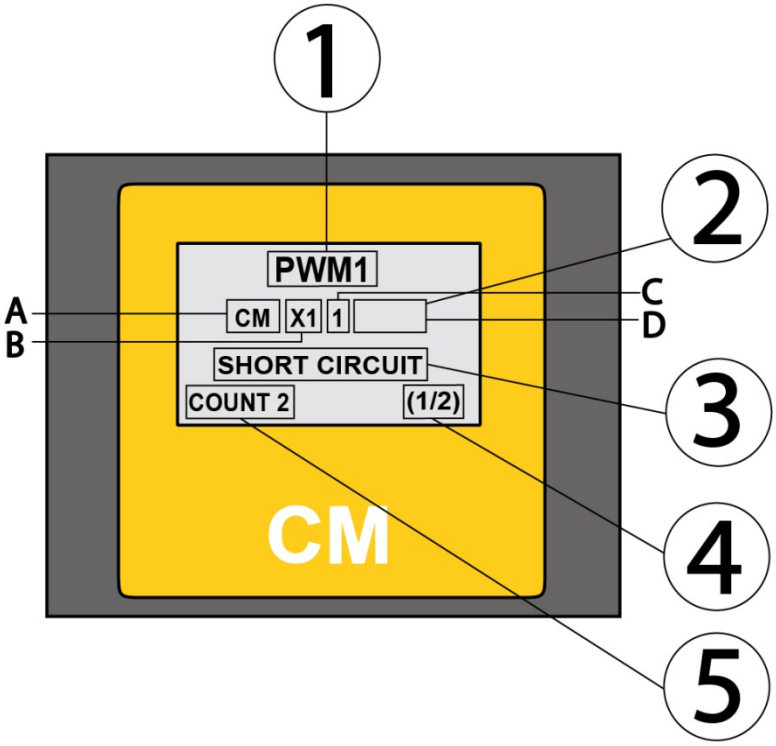
Do no attempt to assemble, use or maintain the Microprop DC2 before you have read and understood all information regarding the tiltrotator, optional equipment and the machine. Be very attentive to the safety information.

WARNING!

Control that the functional label are consistent to the machine function before putting the machine in use.

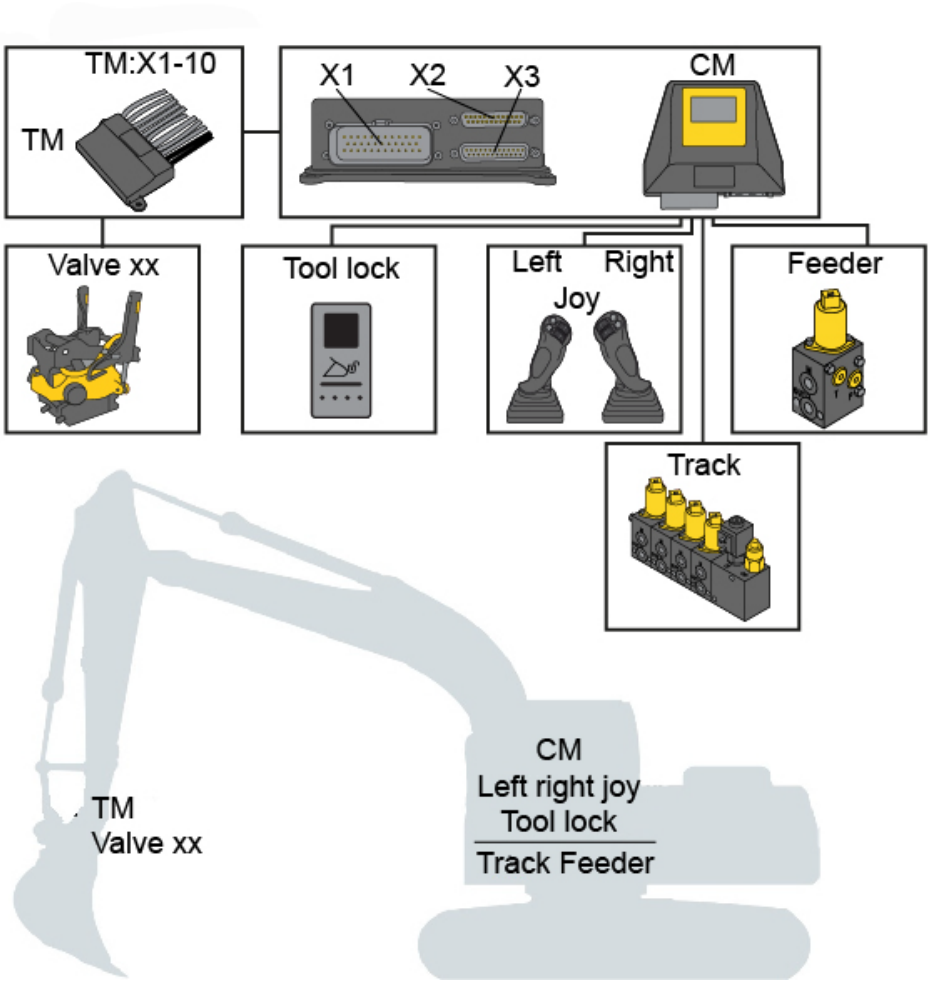
6.ALARMS

6.1. ALARM EXPLANATION



Pos	Note
1	Headline
2.A	Module
2.B	Connector
2.C	Pin
2.D	Faulty function
3	Short description
4	Shown alarm of total number of alarms
5	Number of times the alarm has been activated

6.2. ALARM OVERVIEW



Larmrubrik	Förklaring
CM	Cabin module
TM	Tiltrotator module
VALVE XX	Tiltrotator valve
LEFT/RIGHT JOY	Right or left joystick
TOOL LOCK	Tool lock
FEEDER	Oil feeder valve
TRACK	Track control
SAFE STATE: X (Y)	A safe state according to EN 13849-1. X is description and Y is number of occasions.

6.3. LIST OF ALARMS

In this table X is exchanged to corresponding letter or number shown in the cabin module.

Alarm headline	Connector	Short description	Note
SAFESTATE 1-8	-	-	A safe state caused by internal errors. Repeating errors may mean the system should be exchanged. Contact support personnel.
SAFESTATE 9	-	-	A safe state caused by faulty pressure on CVP1. Control the valve and pressure sensor and the connections.
SAFESTATE 10	-	-	A safe state caused by faulty pressure on CVP2. Control the valve and pressure sensor and the connections.
SAFESTATE 11	-	-	A safe state caused by missing pressure on CVP1. Control the valve and pressure sensor and the connections.
SAFESTATE 12	-	-	A safe state caused by missing pressure on CVP1. Control the valve and pressure sensor and the connections.
CVP MALFUNCTION	CM-X1.XX	NO PRESSURE	No signal from pressure switch CVPx. Control pressure switch and wiring.
DOX	CM-X1.X	SHORT CIRCUIT	Short circuit in digital output.
DOX	CM-X1.X	OPEN CIRCUIT	Open circuit in digital output.
PWM X	CM-X1.X	SHORT CIRCUIT	Short circuit in analog output.
PWM X	CM-X1.X	OPEN CIRCUIT	Open circuit in analog output.

Alarm headline	Connector	Short description	Note
PWM X	CM-X3.X	SHORT CIRCUIT	Short circuit in PWM output.
PWM X	CM-X3.X	OPEN CIRCUIT	Open circuit in PWM output.
PWM X	CM-X3.X	SIGNAL ERROR	Wrong PWM signal from PWM output.
ACT. SWITCH	CM-X3.1	NOT ACTIVE	Activation switch for track or wheel control is inactive.
JOYSTICK	AI CALIBRATION	INVALID	Faulty calibration on analog inputs.
JOYSTICK	CM-X2.X (XAX)	SHORT CIRCUIT	Short circuit in analog input.
JOYSTICK	CM-X2.X (XAX)	OPEN CIRCUIT	Open circuit in analog input.
JOYSTICK	CM-X2.X (XAX)	BELOW MIN / ABOVE MIN	Faulty calibration on analog inputs.
JOYSTICK	CM-X2.X (XAX)	START:OUTSIDE DB	Analog input affected at start up.
JOYSTICK	CM-X2.X-X (XAX)	SIGNAL ERROR	Error at inverted signal.
JOYSTICK	CM-X2.XX-XX (XDX)	SHORT CIRCUIT	Short circuit in digital input.
JOYSTICK	CM-X2.XX-XX (XDX)	OPEN CIRCUIT	Open circuit in digital input.
JOYSTICK	CM-X2.XX-XX (XDX)	START: DI ACTIVE	Digital input affected at start up.
DI SUPPLY	CM-X2.7	SHORT CIRCUIT	Short circuit supply to digital functions.
DI SUPPLY	CM-X3 CM.X1	SHORT CIRCUIT	Short circuit supply to digital functions.
AI SUPPLY	CM-X2.19	SHORT CIRCUIT	Short circuit supply to analog functions.
TOOL LOCK	CM-X3.18-19 (TL)	SHORT CIRCUIT	Short circuit tool lock switch.
TOOL LOCK	CM-X3.18-19 (TL)	START: DI ACTIVE	Tool lock switch active at start up.

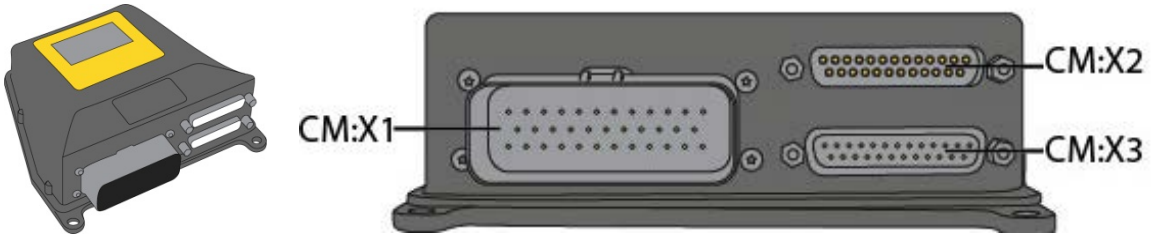
Alarm headline	Connector	Short description	Note
Tiltrotator module (TM)			
TM FAULT	CM-X1.28-35	NO HEARTBEAT	No can bus communication with TM.
CAN SUPPLY	CM-X1.XX	SHORT CIRCUIT	Short circuit supply voltage to TM.
TM VALVES	TM-X2-X10	SHORT CIRCUIT	Short circuit at any of TM analog outputs.
VALVE X	TM-XX XXX X	OPEN CIRCUIT	Open circuit at analog output of TM.
VALVE 1	TM-X1 TOOL LOCK	SHORT CIRCUIT	Short circuit at tool lock at TM.
VALVE 1	TM-X1 TOOL LOCK	OPEN CIRCUIT	Open circuit at tool lock at TM.

7.TECHNICAL DATA

7.1. CABIN MODULE (CM)

Supply voltage	9-32VDC 15A
Enclosure	IP54.
Display	Graphical display 128x64 white backlight
Size	146x145x47mm.
Temp. range	-40 – +85 °C
Outputs	6 analog outputs 2A (2+2A/B) 2 PMW- outputs 4 Digital outputs 3A 3 Digital outputs 100mA
Inputs	17 Digital inputs 6 Analog inputs
Bus	CAN-bus

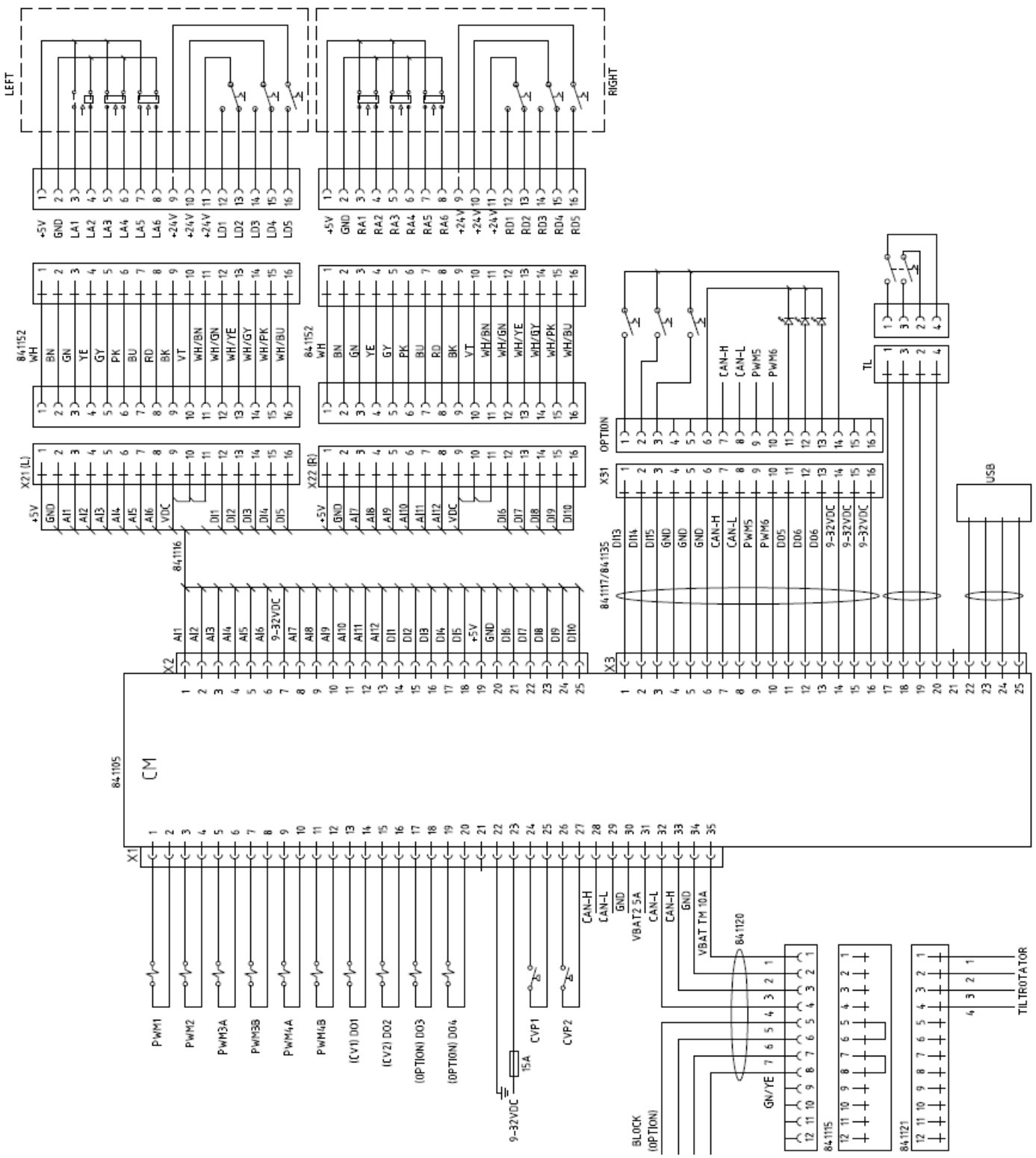
7.1.1. Connectors



CM :X1	Function	CM :X2	Function	CM :X3	Function
1	PWM1 (0-2A)	1	AI1 (LA1)	1	DI13
2	GND	2	AI2 (LA1)	2	DI14
3	PWM2 (0-2A)	3	AI3 (LA2)	3	DI15
4	GND	4	AI4 (LA2)	4	GND
5	PWM3A (0-2A)	5	AI5 (LA2)	5	GND
6	GND	6	AI6 (LA2)	6	GND
7	PWM3B (0-2A)	7	+12/24V	7	CAN-H
8	GND	8	AI7 (RA1)	8	CAN-L
9	PWM4A(0-2A)	9	AI8 (RA1)	9	PWM5 (0-100%)
10	GND	10	AI9 (RA2)	10	PWM6 (0-100%)
11	PWM4B (0-2A)	11	AI10 (RA2)	11	DO5 (100mA)
12	GND	12	AI11 (RA3)	12	DO6 (100mA)
13	DO1 (CV1) (3A)	13	AI12 (RA3)	13	DO7 (100mA)
14	GND	14	DI1 (LD1 NO)	14	+12/24V
15	DO2 (CV2) (3A)	15	DI2 (LD1 NC)	15	+12/24V
16	GND	16	DI3 (LD2 NO)	16	+12/24V
17	DO3 (3A)	17	DI4 (LD2 NC)	17	+12/24V
18	GND	18	DI5 (LD3)	18	DI16 (TL_NEG)
19	DO4 (3A)	19	+5V	19	DI17 (TL_POS)

CM :X1	Function	CM :X2	Function	CM :X3	Function
20	GND	20	GND	20	GND
21	Not connected	21	DI6 (LD1 NO)	21	GND
22	GND	22	DI7 (LD1 NC)	22	GND
23	+9-32VDC 15A	23	DI8 (LD2 NO)	23	USB 5V
24	DI11 (CVP1)	24	DI9 (LD2 NC)	24	USB - DATA
25	+12/24V	25	DI10 (LD3)	25	USB - DATA
26	DI12 (CVP2)				
27	+12/24V				
28	CAN-L				
29	CAN-H				
30	GND				
31	VBAT2 (5A)				
32	CAN-L				
33	CAN-H				
34	GND				
35	VBAT1 (10A)				

7.2. SYSTEM OVERVIEW



MICROPROP DC2
TRACK CONTROL

ADDITION TO MACHINE USER MANUAL.

In this machine the control has been modified with Microprop DC2 track control.. This means that the user must be attentive of the changes that has been made..

The machine original joysticks have been replaced in this machine. The servo controlled functions in the joysticks has not been changed..

Review labels and the user manual of Microprop track control for further instructions.

The assembling firm is obligated to attach this information in the machine user manual.

Place for assembling firm stamp.

Name:_____

MICROPROP AB
Industrivägen 8, SE-901 30
Umeå, Sweden

contact@microprop.se
www.microprop.se